

I. AMENDMENTS TO THE SPECIFICATION

The sections below have been amended in the manner required by
37 C.F.R. §1.121 showing all changes (i.e., with the additions
underlined and the deleted portions stricken through).

A. IN THE "ABSTRACT" Section

Please amend the **ABSTRACT** section as indicated so that only
the single underlined paragraph below appears.

ABSTRACT

A coil for use with a magnetic resonance (MR) system includes a pair of electrically conductive rings and a plurality of rods. The rings are disposed at an opposite ends of the coil from one other, and the rods electrically interconnect the rings to form a birdcage-like structure therewith. The rods and rings are configured to produce about the birdcage-like structure a plurality of partially-overlapped primary resonant substructures, with each primary resonant substructure including two rods and a corresponding section of each of the rings interconnecting them. In this configuration, each primary resonant substructure (i) partially overlaps each of its neighboring primary resonant substructures and electrically shares therewith a region of overlap created thereby and (ii) is capable of receiving MR signals from tissue within its field of view thus enabling each primary resonant substructure to convey the MR signals received thereby via a separate port to the MR system.

~~[(A birdcage coil for use with a magnetic resonance (MR) system comprises a first ring at one thereof, a second ring at the other end thereof, and a plurality of rods electrically interconnecting the first and second rings. The first ring is electrically conductive and has a first diameter. The second ring is electrically conductive and has a second diameter. The rods and first and second rings are configured to form about the birdcage coil a plurality of partially overlapped primary resonant substructures. Each primary resonant substructure includes two of the rods and the corresponding sections of the first and second rings interconnecting them.]]~~

B. IN THE "SUMMARY OF THE INVENTION" Section

Please amend the **SUMMARY OF THE INVENTION** section so that the five underlined paragraphs below replace paragraphs [24] - [27] that span pages 9-11. (For the Examiner's convenience, i.e., ready identification, deleted paragraphs [24], [25], [26] and [27] are reprinted following the underlined replacement paragraphs below.)

SUMMARY OF THE INVENTION

In a presently preferred embodiment, the invention provides a head coil for use with a magnetic resonance (MR) system capable of acquiring images of a region of interest using parallel imaging techniques. The head coil includes a first ring at an inferior end of the head coil, a second ring at a superior end of the head coil, and a plurality of rods electrically interconnecting the first and second rings to form a birdcage-like structure therewith. The first ring is electrically conductive and has a first diameter through which the region of interest is provided access to the head coil. The second ring is electrically conductive and has a second diameter smaller than the first diameter of the first ring. Each rod has a linear portion and a tapered portion with the linear portion being connected to the first ring and the tapered portion being connected to the second ring. The tapered portions of the rods collectively provide the head coil with a substantially homogeneous pattern of magnetic flux density in at least one of three orthogonal imaging planes of the head coil while maintaining and/or improving the signal-to-noise ratio of the head coil. The rods and rings of the head coil are configured to produce about the birdcage-like structure a plurality of partially-overlapped primary resonant substructures, with each primary resonant substructure including two rods and a corresponding section of each of the rings interconnecting them. In this configuration, each primary resonant substructure (i) partially overlaps each of its neighboring primary resonant substructures and electrically shares therewith a region of overlap created thereby and (ii) is capable of receiving magnetic resonance signals from a portion of the region of interest within its field of view thus enabling each primary resonant substructure to convey the magnetic resonance signals received thereby via a separate port to the MR system.

In a broader aspect, the invention provides a coil for use with a magnetic resonance (MR) system. The coil includes a first ring at one end of the coil, a second ring at the other end of the coil, and a plurality of rods electrically interconnecting the rings to form a birdcage-like structure therewith. The first ring is electrically conductive and has a first diameter, and the second ring is electrically conductive and has a second diameter. The rods and rings of the coil are configured to produce about the birdcage-like structure a plurality of partially-overlapped primary resonant substructures, with each primary resonant substructure including two rods and a corresponding section of each of the rings interconnecting them. In this configuration, each primary resonant substructure (i) partially overlaps each of its neighboring primary resonant substructures and electrically shares therewith a region of overlap created thereby and (ii) is capable of receiving magnetic resonance signals from tissue within its field of view thus enabling each primary resonant substructure to convey the magnetic resonance signals received thereby via a separate port to the MR system.

In an even broader aspect, the invention provides a coil for use with a magnetic resonance (MR) system. The coil includes a pair of electrically conductive rings and a plurality of rods. The rings are disposed approximately at an opposite ends of the coil from one other, and the rods electrically interconnect the rings to form a birdcage-like structure therewith. The rods and rings of the coil are configured to produce about the birdcage-like structure a plurality of partially-overlapped primary resonant substructures, with each primary resonant substructure including two rods and a corresponding section of each of the rings interconnecting them. In this configuration, each primary resonant substructure (i) partially overlaps each of its neighboring primary resonant substructures and electrically shares therewith a region of overlap created thereby and (ii) is capable of receiving magnetic resonance signals from tissue within its field of view thus enabling each primary resonant substructure to convey the magnetic resonance signals received thereby via a separate port to the MR system.

In another aspect, the invention provides a coil for use with a magnetic resonance (MR) system. The coil includes a first electrically conductive end member, a second electrically conductive end member, and a plurality of rods electrically interconnecting the first and second end members to

form a unitary structure therewith. The first end member is disposed approximate one end of the coil, and the second end member is disposed approximate the other end of the coil. The rods and end members are configured to produce about the unitary structure a plurality of partially-overlapped primary resonant substructures, with each primary resonant substructure including two rods and a corresponding section of each of the end members interconnecting them. In this configuration, each primary resonant substructure (i) partially overlaps its neighboring primary resonant substructure(s) and electrically shares therewith a region of overlap created thereby and (ii) is capable of receiving magnetic resonance signals from tissue within its field of view thus enabling each of the primary resonant substructures to convey the magnetic resonance signals received thereby to the MR system.

In a related aspect, the invention also provides a neurovascular array for use with a magnetic resonance (MR) system. The neurovascular array includes a head coil, an anterior neck coil, and a posterior cervical spine coil. The head coil includes a first ring approximate one end of the head coil, a second ring approximate the other end of the head coil, and a plurality of rods. The first ring is electrically conductive and has a first diameter, and the second ring is electrically conductive and has a second diameter. The rods electrically interconnect the first and second rings to form a birdcage-like structure therewith. The rods and rings of the head coil are configured to produce about the birdcage-like structure a plurality of partially-overlapped primary resonant substructures, with each primary resonant substructure constituting a coil element having two of the rods and a corresponding section of each of the first and second rings interconnecting them. In this configuration, each coil element of the head coil (i) partially overlaps each of its neighboring coil elements and electrically shares therewith a region of overlap created thereby and (ii) is capable of receiving magnetic resonance signals from tissue within its field of view. The anterior neck coil includes one or more of its own type of coil element, as does the posterior cervical spine coil.

[[In a presently preferred embodiment, the invention provides a birdcage coil for use with an MR system capable of acquiring images of a region of interest using parallel imaging techniques. The birdcage coil comprises a first ring at an inferior end thereof, a second ring at a superior end

~~thereof, and a plurality of rods electrically interconnecting the first and second rings. The first ring is electrically conductive and has a first diameter through which the region of interest is provided access to the birdcage coil. The second ring is electrically conductive and has a second diameter smaller than the first diameter of the first ring. Each rod has a linear portion and a tapered portion, with the linear portion being connected to the first ring and the tapered portion being connected to the second ring. The tapered portions of the rods collectively provide the birdcage coil with a substantially homogeneous pattern of magnetic flux density in at least one of three orthogonal imaging planes of the birdcage coil while at least maintaining and/or improving the signal to noise ratio of the birdcage coil. The rods and first and second rings are configured to form about the birdcage coil a plurality of partially overlapped primary resonant substructures. Each primary resonant substructure includes two of the rods and the corresponding sections of the first and second rings interconnecting them. The primary resonant substructures are capable of being used by the MR system for simultaneous reception of magnetic resonance signals from the region of interest.]]~~

~~[[In a related aspect, invention provides a birdcage coil for use with an MR system capable of acquiring images of a region of interest using parallel imaging techniques. The birdcage coil comprises a first ring at one thereof, a second ring at the other end thereof, and a plurality of rods electrically interconnecting the first and second rings. The first ring is electrically conductive and has a first diameter. The second ring is electrically conductive and has a second diameter different from the first diameter of the first ring. The rods and first and second rings are configured to form about the birdcage coil a plurality of partially overlapped primary resonant substructures. Each primary resonant substructure includes two of the rods and the corresponding sections of the first and second rings interconnecting them. The primary resonant substructures are capable of being used by the MR system for simultaneous reception of magnetic resonance signals from the region of interest.]]~~

~~[[In a broader aspect, invention provides a birdcage coil for use with an MR system capable of acquiring images of a region of interest using parallel imaging techniques. The birdcage coil comprises a first ring at one thereof, a second ring at the other end thereof, and a plurality of rods~~

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~~[[In an even broader aspect, invention provides a birdcage coil for use with an MR system. The birdcage coil comprises a first ring at one thereof, a second ring at the other end thereof, and a plurality of rods electrically interconnecting the first and second rings. The first ring is electrically conductive and has a first diameter. The second ring is electrically conductive and has a second diameter. The rods and first and second rings are configured to form about the birdcage coil a plurality of partially overlapped primary resonant substructures. Each primary resonant substructure includes two of the rods and the corresponding sections of the first and second rings interconnecting them.]]~~